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Coding Boot Camp

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Session : Core10
Introduction to single dimensional arrays

About ***Brandon Long***

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- Teacher of Information Technology (programming), Computer Applications Technology (computer literacy) and Mathematics
- Currently teaching in a high school in Gqeberha, South Africa and has taught in Auckland, New Zealand.
- Create programming videos (and other computer content) for my YouTube channels. Search for ***Mr Long IT and CAT***
- Embarcadero MVP
- Loves superheroes

Session outline

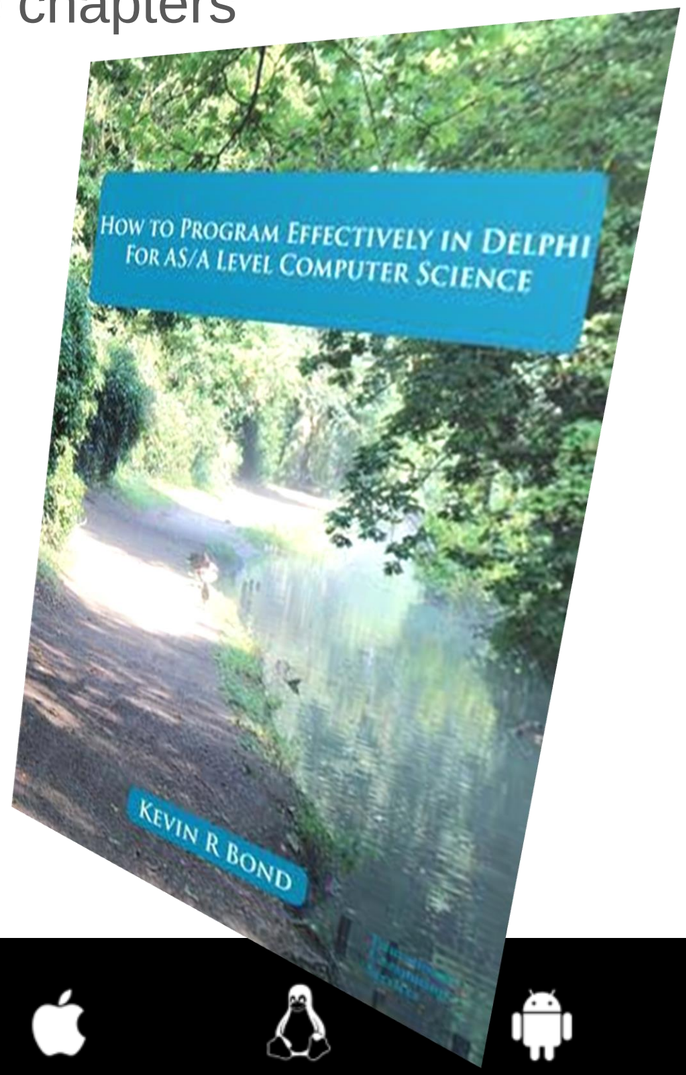
- What is an *array*?
- How to declare an *array*
- Initialising an *array*
- Assigning values to an *array*
- Displaying an *array*
- Calculations on *arrays*

Textbook reference chapters

Chapter **14**

Arrays

Pages 229 - 236



What is an ***array***?


```
var rTime : real ;

begin
 rTime := 13.26 ;
```

rTime

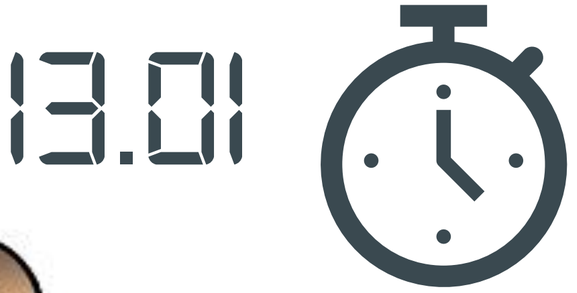
13.26

What is an ***array***?


```
var rTime1, rTime2 : real ;

begin
  rTime1 := 13.26 ;
  rTime2 := 13.01 ;
```

rTime1	*rTime2*
13.26	**13.01**



What is an ***array***?


```
var rTime1, rTime2, rTime3, rTime4, … : real ;
be
  rTime1 := 13.26 ;
  rTime2 := 13.01 ;
```

rTime4

rTime3

rTime1

13.26

rTime5

rTime2

13.01

What is an ***array***?

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```
var rTime1, rTime2, rTime3, rTime4, … : real ;
be
  rTime1 := 13.26 ;
  rTime2 := 13.01 ;
```

1	2	3	4	5	6	…
13.26	**13.01**					

What is an ***array***?


```
var arrTimes : array[ 1 .. 10 ] of real ;

begin
```

arrTimes

INDEX	*1*	*2*	*3*	*4*	*5*	*6*	*...*
VALUE	**13.26**	**13.01**					

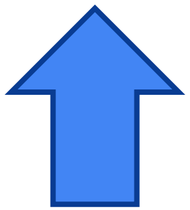
What is an ***array***?


```
var arrTimes : array[ 1 .. 10 ] of real ;

begin
```

arrTimes

INDEX	*1*	*2*	*3*	*4*	*5*	*6*	*...*
VALUE	**13.26**	**13.01**					



value 13.01 at index 2

What is an ***array***?

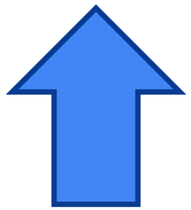

```
var arrTimes : array[ 1 .. 10 ] of real ;

begin

arrTimes[ 3 ] := 12.86 ;
```

arrTimes

INDEX	1	2	3	4	5	6	...
VALUE	13.26	13.01	12.86				



How to declare an *array*

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<*array name*> : array [<*lower*> .. <*upper*>] of <*data type*> ;

```
var arrTimes : array[ 1 .. 10 ] of real ;
    arrYears : array[ 8 .. 12 ] of integer ;
    arrList : array[ -5 .. 5 ] of string ;
    arrGrades : array[ 'A' .. 'F' ] of integer ;
```

INDEX = characters

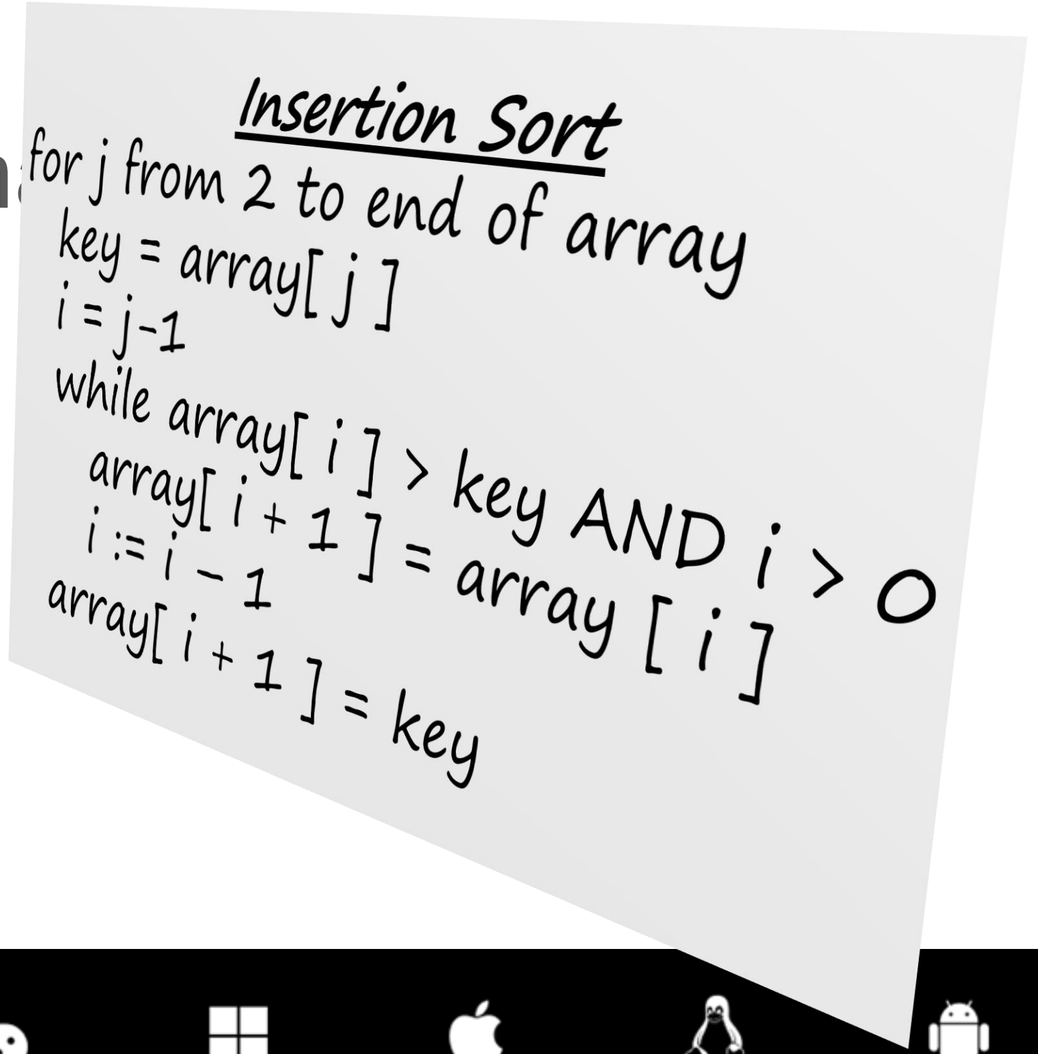
arrGrades

A	B	C	D	E	F

```
begin
```

Calculations on ***arrays***

- Average of an array
- Minimum value in an array (ma
- Insert into an array
- Remove from an array
- Merge two arrays
- Search through an array
- Sort an array



Arrays summary

- Array: single data structure that can store many values
- Each value will be of the same data type as the others

1	*2*	*3*	*4*	*5*
ABC	**XYZ**	**MNO**	**STR**	**DEF**

1	*2*	*3*	*4*	*5*
13.26	**13.01**	**12.95**	**12.85**	**13.15**

Arrays summary

- Array: single data structure that can store many values
- **<*array name*> : array [<*lower*> .. <*upper*>] of <*data type*> ;**
- position
- Declare an array

Arrays summary

- Array: single data structure that can store many values
- Each value will be
  others
- Each cell has an in
  position
- Declare an array
- Assign values to an array

```
<array name>[ <position> ] := <value> ;

arrTimes[ 3 ] := 13.25 ;
```

Arrays summary

- Array: single data structure that can store many values
- Each value will be of the same data type as the others
- Each cell has an index (position) and a value at that position
- Declare an array
- Assign values to
- Loop / traverse an array
- Display / Sum / Minimum
- Already established algorithms that you can use

for *i* := <*lower bound*> to <*upper bound*> do

For more practice

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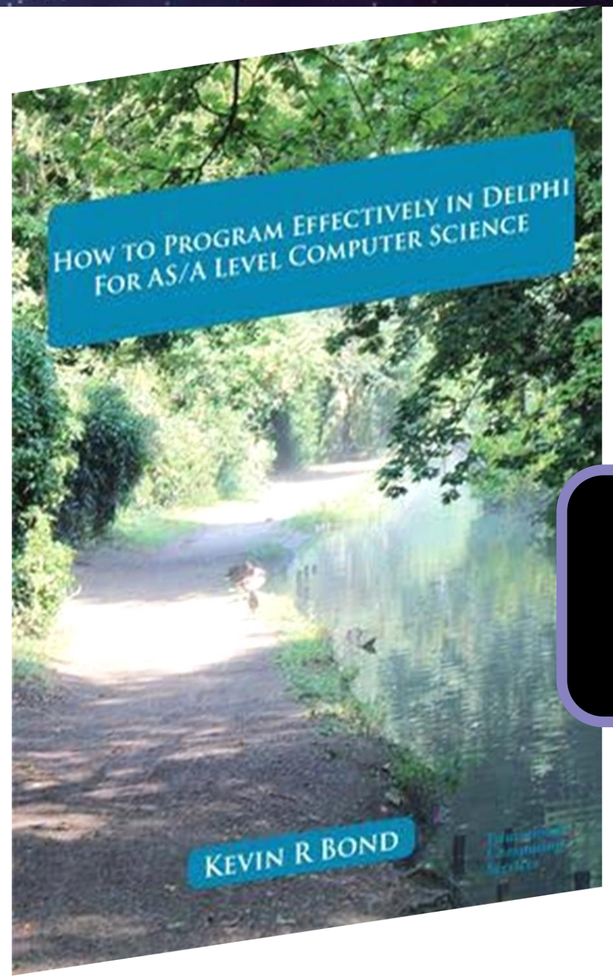

Chapter **14**

Arrays

Pages 229 - 236

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tinyurl.com/MrLongArrays

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Thank you!

Get the code:
github.com/Embarcadero/CodingBootCamp2022